Claims

1. An accelerometer, comprising:
a measurement mass for detecting acceleration, including a housing having a cavity, a spring mass assembly positioned within the cavity, and one or more metal electrode patterns coupled to the spring mass assembly;
a top cap wafer coupled to the measurement mass, including a top capacitor electrode, a top cap balanced metal pattern, a top cap press frame recess, and top cap overshock bumpers; and
a bottom cap wafer coupled to the measurement mass, including a bottom capacitor electrode, a bottom cap balanced metal pattern, a bottom cap press frame recess, and bottom cap overshock bumpers.

2. An accelerometer, comprising:
a measurement mass for detecting acceleration, including a housing having a cavity, a spring mass assembly positioned within the cavity, one or more metal electrode patterns coupled to the spring mass assembly, and one or more passages for venting air from the cavity in the housing.;
a top cap wafer coupled to the measurement mass, including a top capacitor electrode, a top cap balanced metal pattern, a top cap press frame recess, and top cap overshock bumpers;
a bottom cap wafer coupled to the measurement mass, including a bottom capacitor electrode, a bottom cap balanced metal pattern, a bottom cap press frame recess, and bottom cap overshock bumpers.

3. A method of fabricating an accelerometer, comprising:
fabricating a measurement mass for detecting acceleration that includes a housing having a cavity, and a spring mass assembly positioned within the cavity;
fabricating a top cap wafer;
fabricating a bottom cap wafer;
vertically stacking the measurement mass, the top cap wafer, and the bottom cap wafer in an approximately parallel manner;
bonding the top cap wafer to a side of the measurement mass using a bonding process;
bonding the bottom cap wafer to another side of the measurement mass using the bonding process; and
making one or more dicing cuts at predetermined locations on the accelerometer.

4. A method of bonding an accelerometer, comprising:
fabricating a measurement mass that includes a housing having a cavity, a spring mass assembly positioned within the cavity, and one or more bond rings coupled to the housing;
fabricating a top cap wafer that includes a top bond ring and a top cap press frame recess;
fabricating a bottom cap wafer that includes a bottom bond ring and a bottom cap press frame recess;
vertically stacking the measurement mass, the top cap wafer, and the bottom cap wafer in an approximately parallel manner;
bonding the top cap wafer to a side of the measurement mass using a bonding process; and
bonding the bottom cap wafer to another side of the measurement mass using the bonding process.

5. A method of shaping a wafer to create components for a sensor, comprising:

applying an etch-masking layer and an etch-stop layer to the wafer;
patterning the etch-masking layer to create an area of exposure in the etch-masking layer;
applying one or more etching agents to the area of exposure to remove the etch-masking layer within the area of exposure;
applying one or more etching agents to the area exposure to shape the wafer into a housing, a measurement mass, and one or more springs down to the etch-stop layer; and
maintaining the etch-stop layer on the springs.

6. A sensor, comprising:
a measurement mass assembly including a housing, a measurement mass including one or more electrodes, and a plurality of springs for coupling the measurement mass to the housing;
a top cap wafer coupled to the measurement mass assembly including a top cap overshock bumper pattern designed to reduce stiction within the sensor; and
a bottom cap wafer coupled to the measurement mass assembly including a bottom cap overshock bumper pattern designed to reduce stiction within the sensor.

7. A metal electrode pattern for use in a sensor, comprising:
a metal electrode including a stiction-reducing pattern.

8. A method of creating a stiction-reducing metal electrode pattern for use within a sensor, comprising:
etching a surface pattern onto a surface of the sensor;
applying a metal layer to the surface of the sensor including the surface pattern; and
molding the metal layer to create the stiction-reducing metal electrode pattern.

9. A method of creating a metal electrode pattern including reduced-thickness recesses for reducing stiction between the metal electrode pattern and overshock bumpers within an accelerometer, comprising:
creating a lower metal electrode pattern layer;
applying an upper metal electrode pattern layer on top of the lower metal electrode pattern layer; and
selectively removing one or more portions of the upper metal electrode pattern layer to create the reduced-thickness recesses and expose the underlying lower metal electrode pattern layer within the metal electrode pattern.

10. A method of creating a metal electrode pattern including cavities for reducing stiction between the metal electrode pattern and overshock bumpers within an accelerometer, comprising:
creating a lower metal electrode pattern layer;
applying an upper metal electrode pattern layer on top of the lower metal electrode pattern layer; and
selectively removing one or more portions of the upper metal electrode pattern layer and the lower metal electrode pattern layer to create the cavities within the metal electrode pattern.

11. A method of creating a metal electrode pattern including reduced-thickness recesses for reducing stiction between the metal electrode pattern and overshock bumpers within an accelerometer, comprising:
creating a metal electrode pattern; and
selectively removing one or more portions of the metal electrode pattern to create the reduced-thickness recesses and expose an underlying layer of the metal electrode pattern.

12. A method of creating a metal electrode pattern including cavities for reducing stiction between the metal electrode pattern and overshock bumpers within an accelerometer, comprising:

creating a metal electrode pattern; and

selectively removing one or more portions of the metal electrode pattern to create the cavities.